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INT CL[5] H03M

(54) Alphanumeric data entry systems

(57) The data entry system includes a keypad having twelve data entry keys (19) and three shift keys (13, 15, 17). In the first mode of the data entry system, numeric characters are entered by a single keystroke. The other modes are activated by sequential keystrokes of a respective shift key (13, 15, 17) and a data key (19). The shift keys (13, 15, 17) are color coded with respect to the alpha characters entered by a particular key. The keypad is in bus communication with a keypad driver which in turn is in bus communication with a microprocessor.

FIG. 2

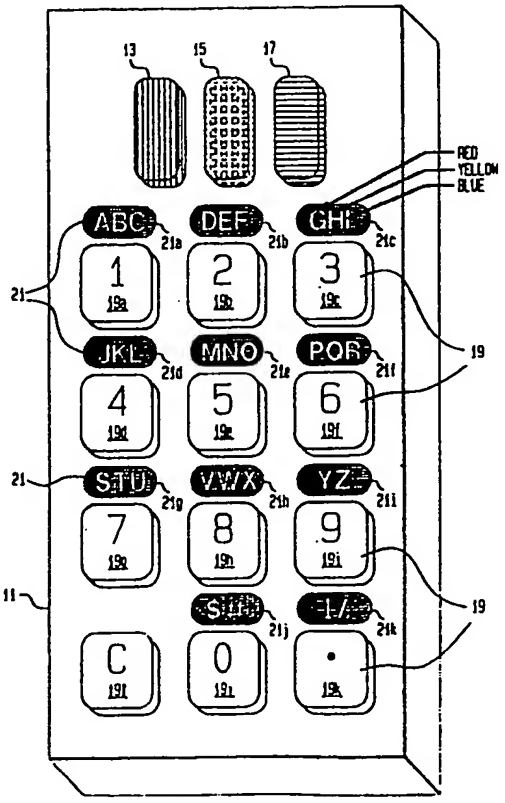

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FIG. 1

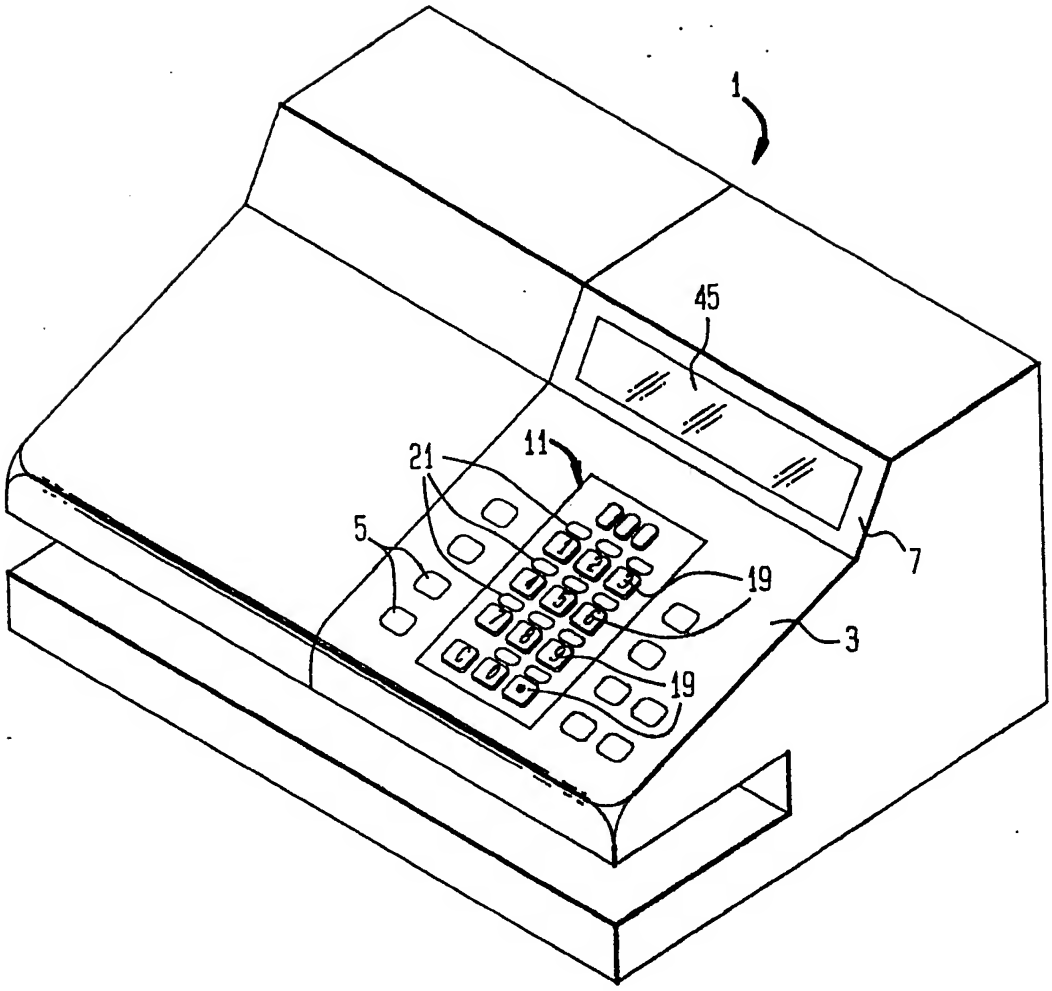


FIG. 2

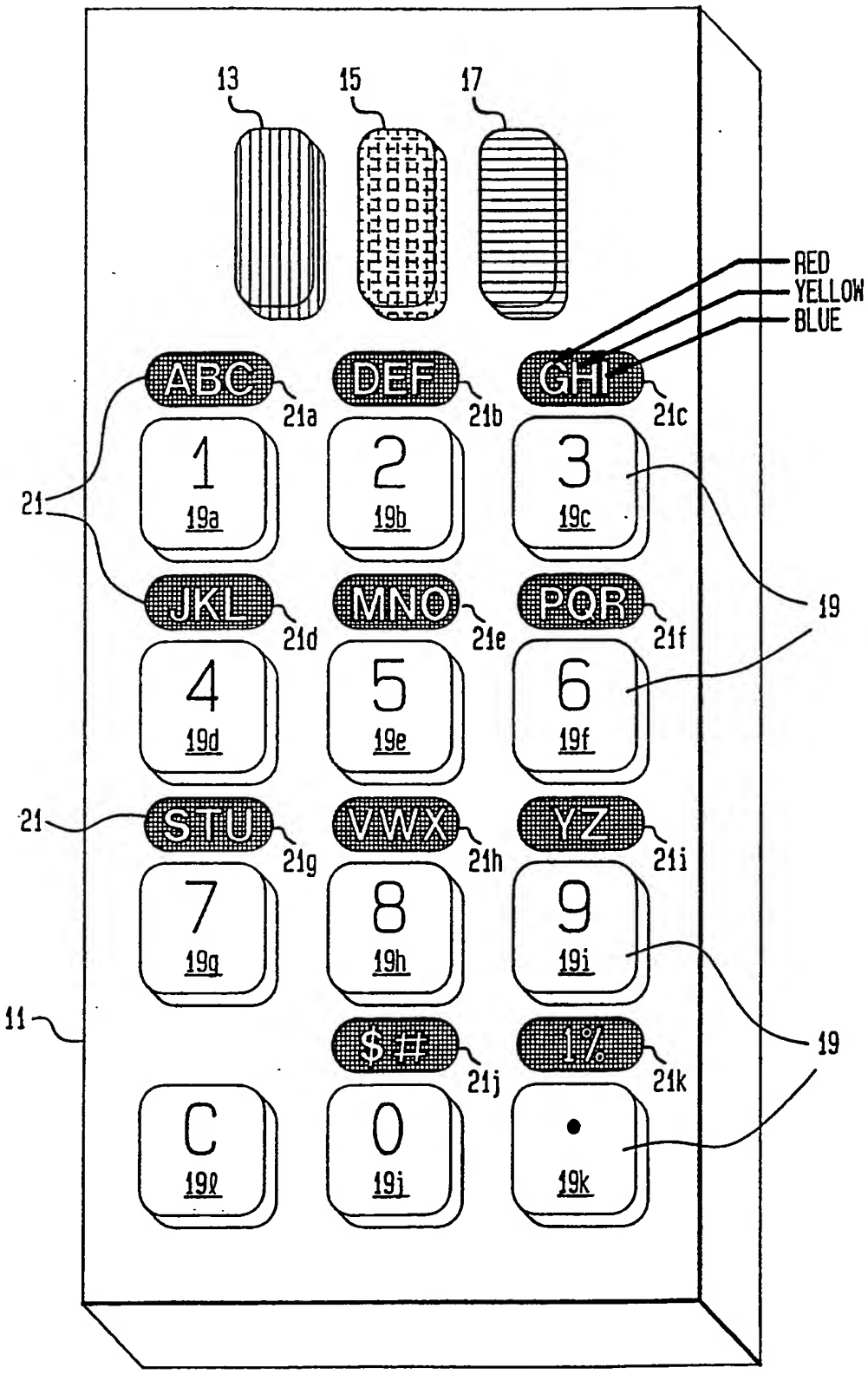

13
15
17
RED
YELLOW
BLUE
ABC
21a
DEF
21b
GHI
21c
1
19a
2
19b
3
19c
21
JKL
21d
MNO
21e
PQR
21f
19
4
19d
5
19e
6
19f
21
STU
21g
VWX
21h
YZ
21i
7
19g
8
19h
9
19i
11
$ #
21j
1/¢
21k
19
C
19l
0
19j
•
19k

FIG. 3

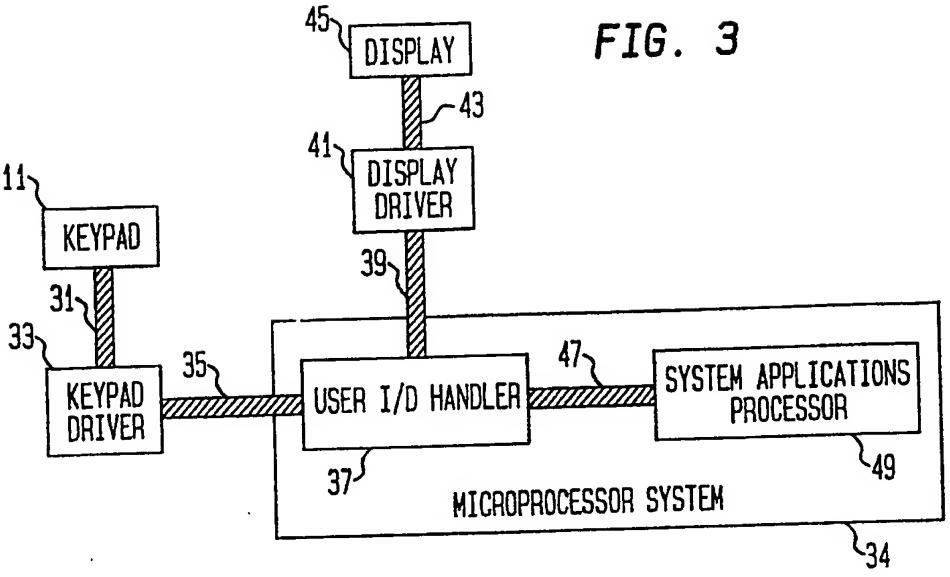
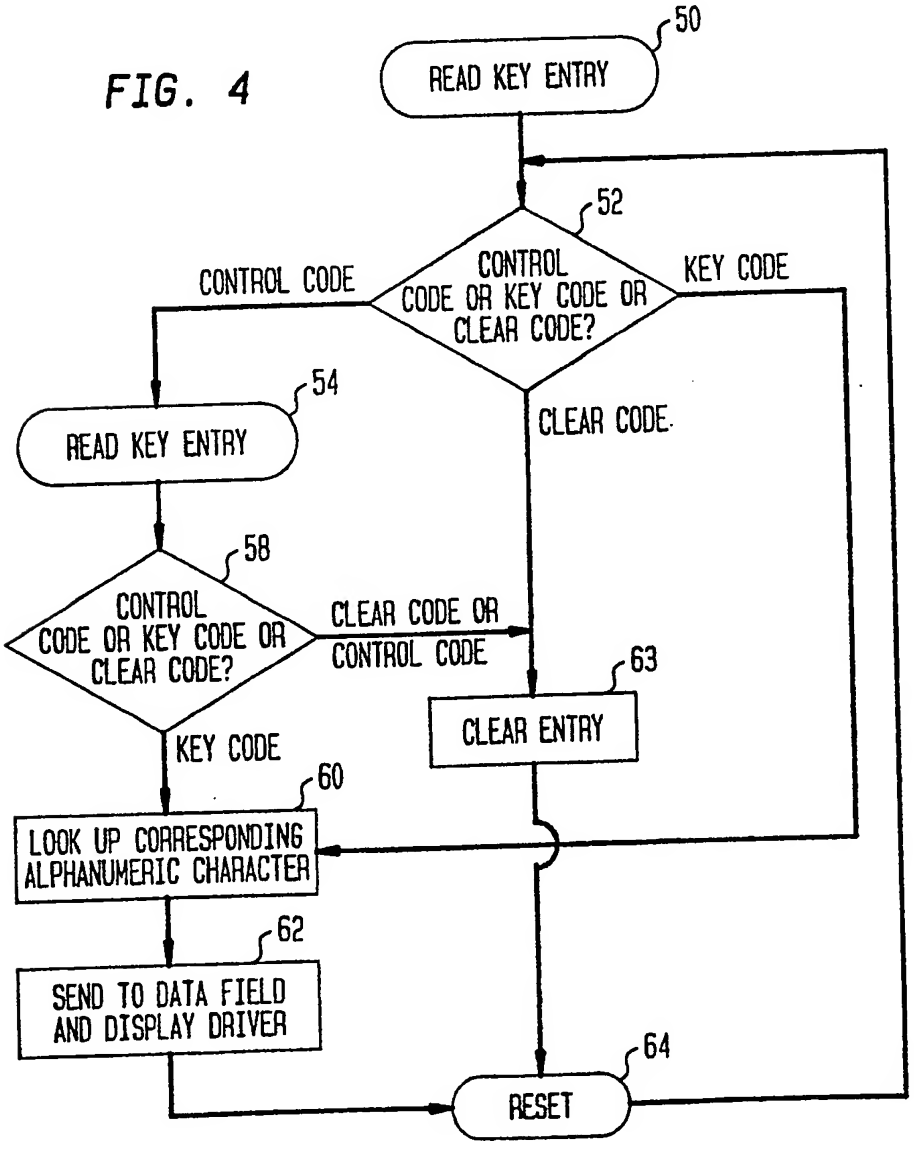

45
DISPLAY
43
41
DISPLAY DRIVER
11
KEYPAD
39
31
33
35
47
SYSTEM APPLICATIONS PROCESSOR
KEYPAD DRIVER
USER I/D HANDLER
49
37
MICROPROCESSOR SYSTEM
34

FIG. 4


50
READ KEY ENTRY
52
CONTROL CODE OR KEY CODE OR CLEAR CODE?
CONTROL CODE
KEY CODE
CLEAR CODE
54
READ KEY ENTRY
58
CONTROL CODE OR KEY CODE OR CLEAR CODE?
CLEAR CODE OR CONTROL CODE
63
CLEAR ENTRY
KEY CODE
60
LOOK UP CORRESPONDING ALPHANUMERIC CHARACTER
62
SEND TO DATA FIELD AND DISPLAY DRIVER
64
RESET

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ALPHANUMERIC CHARACTER DATA ENTRY SYSTEMS

The present invention relates to keypad data entry systems.

Conventional microcomputer and other microprocessor based systems user interface systems utilize a keyboard user data entry systems having a rather extensive number of keys, in excess of twenty-six. The keys generally represent a unique alpha character and numeric character for inputting that character by a single operator keystroke. The simultaneous or bi-sequential keystroke combination of the shift key plus the alpha or numeric keystroke will input a special character such as a capital alpha character or such other special characters. The keypad may also include a plurality of function keys, which are functionally definable by the application software to perform special system functions or execute software routines. It is known to provide a separate numeric keypad in conjunction with the alphanumeric keyboard. Such keypads are provided for operator convenience providing an alternate means numeric data entry. The numeric keypad generally requires a single keystroke to enter numeric system data and simultaneous or sequential keystrokes to enter system function data. The described conventional keyboard and keypad setups are particularly suited for the input of a large amount of entry data in alpha and numeric formats respectively.

In certain applications such as mail processing applications, it is known to use an operator interface system having numeric characters arranged in a three-by-four matrix very similar to a conventional numeric keypad. Such interfaces usually have a single mode input. For example, electronic postage meters have customary been designed such that the primary entry data is numeric with no alpha

generally utilizing function keys for non-numeric data input or to activate special machine functions.

Mailing machines are becoming more intelligent through the use of microprocessor based systems. Such machines are capable of recording limited batch account data and other limited functionality. In order to user interface to this intelligence, it is known to provide such machine with a small display and the single mode keypad in combination with function keys. The interface system is generally menu driven in a decision tree manner with the operator depressing one of the numerical keys to make a particular branch choose and enter data. The presence of function keys reduces somewhat the number of required tree branches. However, as machine intelligence increases, it has been discovered that the size of the required menu decision tree increases in proportion to intelligence. One solution would be to employ a conventional alphanumeric keyboard; however, this solution would require a substantial increase of machine space to accommodate the alphanumeric keyboard.

According to a first aspect of the present invention, there is provided an alphanumeric character data entry system, comprising: a keypad having a plurality of depressible data entry keys and shift keys; first means for communicating keystroke sequences of said keypad; and means in bus communication with said first means for assigning a unique code for a single data key entry stroke and for a combined shift key and data key entry stroke.

According to a second aspect of the present invention, there is provided an alphanumeric character data entry system, comprising: a keypad having a plurality of depressible data entry keys and shift keys; first means for communicating keystroke sequences of said keypad; and means in bus communication with said first means for assigning a unique code for any combination of data key entry strokes and shift key strokes.

According to a third aspect of the present invention, there is provided a method of assigning a unique code to an alphanumeric character array, comprising the steps of:

(a) depressing a single data entry key to specify a unique one of the characters of a first subset of the character array;

(b) depressing a first shift key followed by a data entry key to specify a unique one of the characters of a second subset of the character array; and

(c) depressing a ninth shift key followed by a data entry key to specify a unique one of the characters of the ninth subset of the character array.

The alphanumeric data entry system of the present invention is most suited for use in a mailing machine, wherein operator alpha character data entered is intended to be at a minimum.

In one embodiment, the keypad has twelve data entry keys plus three function keys capable of sequential keystroke entry of ten numeric characters, twenty-six alpha characters and a plurality of special characters. The data entry keys have a plurality of active modes. In the first mode, numeric characters are entered by a single keystroke, the other modes being activated by sequential keystrokes of a respective function key and a data key, for example, to enter alpha and/or special characters. The shift keys are color coded with respect to the alpha characters entered by a particular key. The keypad is in bus communication with a keypad driver which in turn is in bus communication with a microprocessor. The entry of a keystroke causes the keypad driver to communicate to the microprocessor a code representative of a numeric character. Should the operator first enter a shift keystroke, then the keypad driver communicates a code representative of a unique alpha or special character.

The invention will now be described by way of a non-limiting embodiment with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view of a mailing machine having a data entry system in accordance with the present invention;

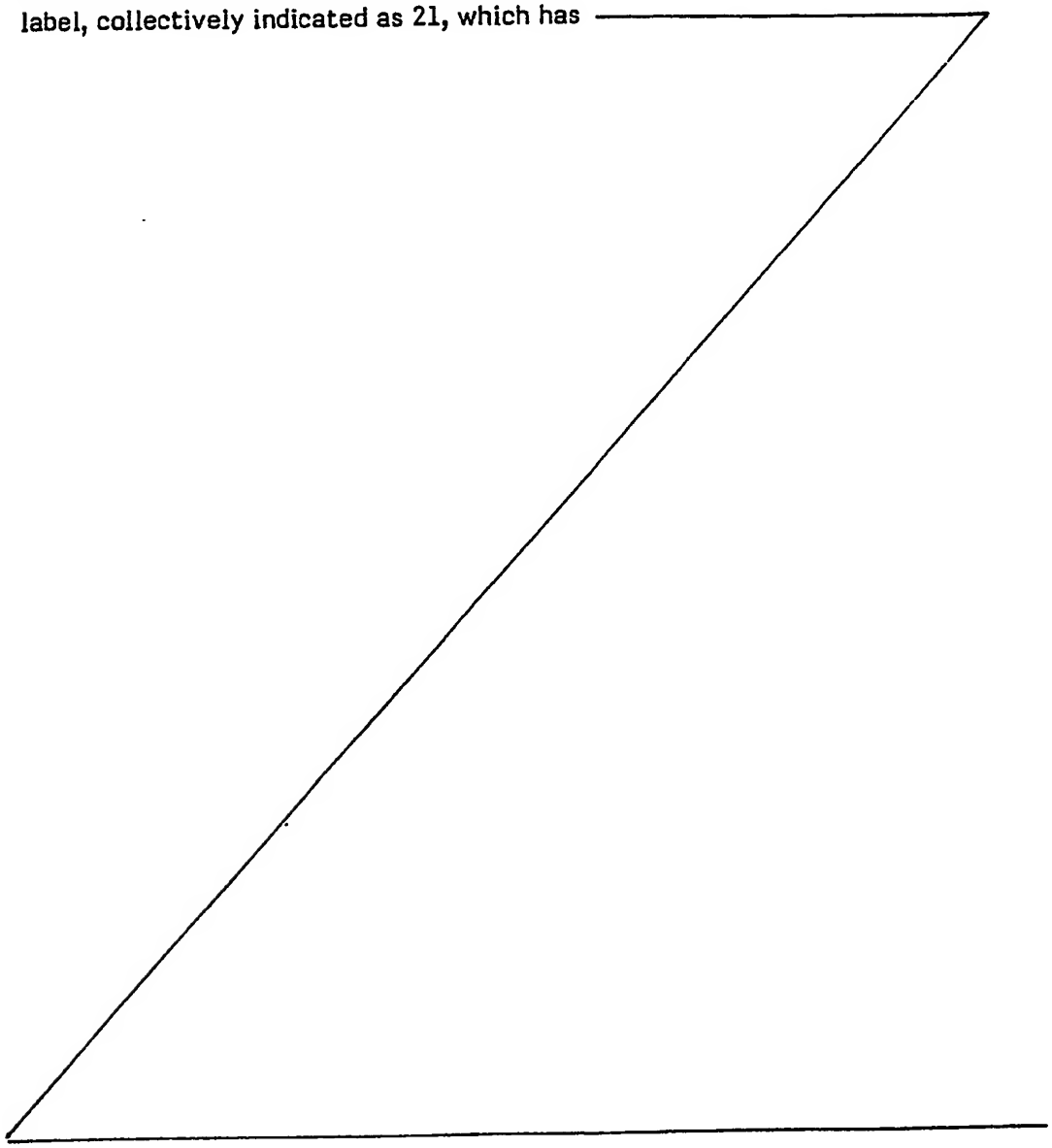
Fig. 2 is a perspective view of a suitable keypad layout for the data entry system of Fig. 1;

Fig. 3 is a schematic representation of a keypad and microprocessor system arrangement in accordance with the present invention in combination with a suitable driver and microprocessor display system; and

Fig. 4 is a logic flow for the data entry system of Fig. 1.

Referring to Fig. 1, a mailing machine having postage printing means, generally indicated as 1, includes a panel 3 for receiving a keypad, generally indicated as 11. A plurality of function keys 5 may also be mounted in the panel 3. A second panel 7 of the mailing machine 1 has a visual display 45.

Referring more particularly to Fig. 2, the keypad 11 includes three shift keys 13, 15 and 17, respectively, and twelve alphanumeric keys, collectively indicated as 19. Each key 19a through 19j in a first mode represents the respective numerals one through nine and zero. A clear key 19l and a decimal key 19k are also provided. Above selected keys 19 is a label, collectively indicated as 21, which has



marked thereon at least two characters except for the clear key 191.

Referring more particularly to Fig. 3, the keypad 11 is in bus 31 communication with the keypad driver 33 which is bus 35 communication with a microprocessor, generally indicated as 34. The microprocessor 34, for the purposes of this invention may be a conventional type. The microprocessor 34 includes a user Input/Output (I/O) handler which is in bus communication with the system application software processor 49 through bus 47.

The user I/O handler 37 is also in bus 39 communication with a conventional display driver 41 which in turn is in bus 43 communication with the display 45. Keystrokes entered through the keypad 11 are received by the keypad driver 33 and transmitted to the user I/O handler 37 through bus 35 in a conventional manner whereupon the keystroke information is caused to be received by the system applications software processor 49 and displayed on the display 45 through the display driver 41 in any suitable conventional manner.

Referring more particularly to Figs. 2 and 4, it is possible to enter ——————————————— alphanumeric and special characters for use by the microprocessor system 34. To enter a number, one through nine and zero which is respectively keys 19a through 19j, an operator merely presses the respective key bearing a corresponding numeric indicia. Upon entering the keystroke, the user I/O handler 37 receives the keystroke information at logic block 52 from the keypad driver 33. At logic block 52, it is determined whether it is a control code, i.e., a shift key 13, 15 or 17, which has been first depressed, or a keycode, i.e., a keystroke has been first depressed or the clear key 191 has been depressed. If a keycode has been received, the user I/O handler will then proceed to logic block 60 where it looks up the corresponding numeric character and then proceeds to logic block 62 where the corresponding numeric code is sent to the data field of the system application software processor 49 and to the display driver 41 for

code has been hit, the user I/O then proceeds to logic block 54 to stand ready to receive a second key entry. Upon receiving the second key entry at 54, it is tested at logic block 58 to see whether the key entry is a control code keycode or clear code. If it is a keycode, the user I/O then proceeds from logic block 58 to logic block 60 where it looks up the corresponding alpha character represented by the combination control code and keycode entered. From logic block 60, the user I/O handler 37 proceeds to logic block 62 and sends the appropriate alpha character to the system data field and driver display as previously described. The user I/O proceeds from logic block 60 to logic block 64 for a reset and back to logic block 50 to receive additional keystrokes.

Returning to logic block 50, if at that juncture a clear code has been hit as the initial keystroke, the user I/O proceeds to clear entries at logic block 63 and then proceeds to logic block 64 for a reset of the user I/O. If at logic block 58, a clear code or control code has been received, in like manner the system proceeds to logic block 63 to clear entries and then proceeds to logic block 64.

The function key 33, 15 and 17 are color coded, preferably red, yellow and blue, respectively. The color coding corresponds to the represented alpha characters on the labels 21, respectively, in red, yellow and blue. For example, the label 21C may bear an alpha G in red, an alpha H in yellow and an alpha I in blue. Therefore, to enter the numeric character 3, one merely depresses the key 19c and the numeral three is transferred to the microprocessor 34 for display and entered in the appropriate application system software data field. Should the operator wish to enter the alpha character H, for example, all the operator need do is press the yellow shift key 15 followed by depression of the 19C key which would then enter the alpha character H in the appropriate data field and cause to be displayed on the display 45. In like manner, the other alpha characters may be entered into the system. Special characters such as a dollar sign and a

a like manner. It should now be appreciated that the alphanumeric data entry system ———————— allows the entry of a full array of alphanumeric characters in addition to special characters into the data field with a minimum of total keys. It should also be appreciated that the shift keys 13, 15 and 17 may also be used in combination with the function keys 5 to provide additional system flexibility.

CLAIMS

1. An alphanumeric character data entry system, comprising:

a keypad having a plurality of depressible data entry keys and shift keys;

first means for communicating keystroke sequences of said keypad; and

means in bus communication with said first means for assigning a unique code for a single data key entry stroke and for a combined shift key and data key entry stroke.

2. An alphanumeric character data entry system as claimed in claim 1 wherein said keypad includes not more than twelve data entry keys and not more than three function keys, whereby a data message may be entered by an operator by depressing a data entry key or depressing a shift key followed by a data entry key.

3. An alphanumeric character data entry system as claimed in claim 2 wherein thirty-six discrete data messages may be entered by depressing a single data entry key or a combination of a data entry key and a shift key.

4. An alphanumeric character data entry system, comprising:

a keypad having a plurality of depressible data entry keys and shift keys;

first means for communicating keystroke sequences of said keypad; and

means in bus communication with said first means for assigning a unique code for any combination of data key entry strokes and shift key strokes.

5. A method of assigning a unique code to an alphanumeric character array, comprising the steps of:

(a) depressing a single data entry key to specify a unique one of the characters of a first subset of the character array;

(b) depressing a first shift key followed by a data entry key to specify a unique one of the characters of a second subset of the character array; and

(c) depressing a ninth shift key followed by a data entry key to specify a unique one of the characters of the ninth subset of the character array.

6. An alphanumeric character data entry system substantially as herein described with reference to and as illustrated in the accompanying drawings.

7. A method of assigning a unique code to an alphanumeric character array, substantially as herein described with reference to the accompanying drawings.